

Local mineral beneficiation to present challenges

 By [James Fungai Maposa](#)

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Over the last few years the South African government has advocated for the domestic beneficiation of locally mined minerals in an effort to grow the economy and create employment. To support this initiative, the government has developed a Beneficiation Strategy which identified ten commodities (chromium, coal and uranium, nickel, manganese, diamonds, platinum, gold, titanium, iron-ore and vanadium) and five value chains (energy, iron & steel, pigment & titanium, autocatalytic converters and diesel particulate filters and jewellery fabrication) for the country's mineral beneficiation drive. According to the government, identified potential benefits of domestic mineral beneficiation include job creation, increasing government tax revenues and reduced imports of beneficiated products into the country.



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With all of the above-listed potential benefits, and South Africa's vast in-situ mineral wealth (estimated at USD2.50 trillion in 2010); further value addition of locally mined commodities is a no brainer. A maturing mining sector and rising unemployment are among the factors pushing the South African government to think of other methods for reinvigorating the economy's growth. With the country's economy currently built on the extraction of South Africa's mineral resources, beneficiation stands out as the next 'economic frontier'. The government lists domestic mineral beneficiation as a key sector in its New Growth Path (NGP) strategy to create five million new employment opportunities by 2020.

Despite these positives, there are substantial challenges that stand in the way of South Africa's mineral beneficiation success. Major obstacles for local beneficiation include imminent energy shortages, skills shortages and the identification and access of markets for locally beneficiated products. Other challenges include beneficiation infrastructure constraints and raw material access risks. Unless innovative solutions are put in place by relevant stakeholders to overcome the aforementioned obstacles, realising the beneficiation dream will extend far beyond government's planned 2020 horizon.

Imminent energy shortages

Mineral beneficiation is divided into four stages:

- **Stage 1:** Extraction and ore concentration
- **Stage 2:** Metal alloy production
- **Stage 3:** Saleable product manufacture
- **Stage 4:** Sales of final product to the consumer

Processing of minerals along the first three stages of the mineral beneficiation value chain requires the smelting, moulding and re-smelting of the extracted mineral commodities. Smelting and re-smelting of the mineral concentrates renders mineral beneficiation an energy intensive sector. South Africa's power sector is currently under extreme pressure, driven by increasing demand from existing economic sectors. Based on the country's current power supply deficit, investment into local mineral beneficiation will exacerbate the situation. In addition to the imminent shortages, escalating electricity prices is another factor that has made South Africa less competitive when compared to its Asian counterparts (China and India). South Africa's power supply shortages and rising electricity prices will, therefore, curtail investment into domestic mineral

beneficiation. Eskom, however, expects to have increased electricity supply by 2016. Despite this positive, potential beneficiation investors are unsure whether the added capacity will be enough to support the establishment and development of a local mineral beneficiation sector along the South African government's listed five value chains. Co-generation is a factor potential beneficiation investors will have to explore to ensure electricity supply security over the short- and medium-term.

Mineral beneficiation research and development inadequacies

Mineral beneficiation is a technology-driven industry, requiring significant investment to develop innovative capital equipment that enables beneficiating companies to manufacture lower costing, and quality end-user products. Lower cost production allows the beneficiating companies to maintain a price competitive advantage in a global market where consumer price sensitivity has increased. South Africa's exposure to research and development for the mineral beneficiation sector is limited and puts the country's beneficiation drive on the back foot. Limited mineral beneficiation technology research and development exposure implies that the country will rely on the developed world and countries such as China and India, to drive the country's beneficiation innovation. To avoid such a situation, South Africa should engage all relevant stakeholders to establish a Mineral Beneficiation Research and Development Policy and Fund, enabling the country to develop in-country research and development expertise on mineral beneficiation technologies.

Skills shortages

Although beneficiation is expected to create significant employment opportunities within the country, substantial investments will have to be poured into developing the required skills and expertise for the aforementioned job opportunities. South Africa's existing scientist and engineering skills shortages, therefore, require immediate attention. Failure to build the required talent pipeline will result in a rise in expatriate hires for the beneficiation sector from Europe, North America, China and India during the short- and medium-term. Over the last few decades, China and India have invested in building their skilled labour pool whose capability and quality continues on an upward trend, driven by rising internal competition. Based on this vast talent pool, South Africa's Asian counterparts will continue to lead the technological innovation front for the foreseeable future. Going forward, the success of establishing a local mineral beneficiation sector will also depend on how well the nation is able to develop the required skills and talent pool.

Access to international markets for locally beneficiated products

The most important question that potential beneficiating companies should be asking is which markets will we sell our manufactured products to? Most of the world's mineral beneficiating companies are located in the developed world where an established and mature market consumes the products that the industry manufactures. As it is expected that there will be limited regional (sub-Saharan Africa) demand for the beneficiation industry's manufactured products, the country's mineral beneficiation sector may want access to these international markets to sustain its growth objectives.

Unless the South African industry is able to supply its products at lower price and a better quality than that of its Asian competitors, access to these markets will be cumbersome. Rapid economic growth of China and India has also created

supply opportunities, within these countries, for some of the products that are planned for manufacture by the South African beneficiation industry. However, China and India have major cost advantages, which have resulted in these two countries becoming the manufacturing hub of the developed world that is able to produce goods of the highest quality and at the lowest production cost. The competitiveness of South African products will also be impacted by high transport costs. To succeed, the country's mineral beneficiation industry will have to manufacture products that can be promoted to domestic and regional markets where it is possible to gain an advantage through negotiated strategic long-term supply agreements.

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